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IS 15655 (2006): Telecommunication facilities for operation and maintenance of oil and gas pipeline [LITD 10: Power System Control and Associated Communications]



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“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

तेल और गैस पाईप लाईन के प्रचालन व अनुरक्षण
के लिए दूरसंचार सुविधाएँ

Indian Standard

**TELECOMMUNICATION FACILITIES FOR
OPERATION AND MAINTENANCE OF
OIL AND GAS PIPELINE**

ICS 33.030; 75.200

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Power System Control and Associated Communications Sectional Committee had been approved by the Electronics and Information Technology Division Council.

The object of this standard is to enlist various types of telecommunication facilities such as dedicated voice communication facility (using normal DTMF Telephone) at all pipeline stations (unmanned/manned), at SCADA Master Control Center (SMC) and at Telecom Network Management Center (TNMC), VHF Walkie-Talkie system, Paging system, Public Address system, EPABX system, etc, which are required to be available for smooth and efficient operation and maintenance of oil and gas pipelines.

Indian Standard

TELECOMMUNICATION FACILITIES FOR OPERATION AND MAINTENANCE OF OIL AND GAS PIPELINE

1 SCOPE

This standard enlists various types of telecommunication facilities required for smooth and efficient operation and maintenance of oil and gas pipelines.

2 TELECOMMUNICATION FACILITIES

For the efficient operation and maintenance of oil and gas pipeline system, typically following telecommunication facilities have been provided:

2.1 Voice Communication Facility

Following voice communication facilities are provided:

- a) *Inter-Office Voice and Fax Communication Facility* — For the inter-office communication, the direct telephone dialing facility between the manned stations/locations of the pipeline network shall be provided. This facility shall enable selective as well as multi-party conference calls, involving the users of same or different stations.

If required, facsimile communication may also be provided amongst all attended stations for office communication purpose.

- b) *Communication Facility for Pipeline Maintenance* — For pipeline maintenance purpose, dedicated voice communication facility (using normal DTMF telephone) is provided at all pipeline stations (unmanned/manned), SCADA Master Control Center (SMC), Telecom Network Management Center (TNMC) for pipeline maintenance group.

For the same, one telephone shall be installed in each station, which is connected over long extension cord (depending upon the distance between telecom room and field, typically 25 m) for taking the telephone set to the field during any O&M activity. In certain cases, an explosion proof telephone with acoustic booth may be installed in hazardous area of pipeline station for voice communication. Using this telephone, multi-party conference call (typically 4 to 8 users) shall be possible.

In case of longer pipeline, if the same is

divided into number of O&M jurisdictions, dedicated voice channel for each jurisdiction, having connectivity with SMC and TNMC may also be provided having selective and multi-party conference call facilities.

Depending upon the pipeline maintenance philosophy, pipeline maintenance telephone of all stations may be connected over omnibus VF channel, which allows selective and conference calls.

- c) *Communication Facility for Pipeline Station Watchmen* — For watchman communication, each pipeline station (unmanned/manned) shall be provided with telephones. For the same, the telephone connection from telecom room to be extended to watchman room at all the un-manned stations and to the security in-charge room at manned stations.

Depending upon security policy any of the following communication facilities may be provided:

- 1) Watchmen at unmanned stations shall be able to contact only the security-in-charge and no two watchmen unmanned stations will be able to talk to each other.
- 2) Watchman and security-in-charge telephones shall be on omni-bus channel, which allows selective and conference call.
- 3) Normal point-to-point selective telephone dialing facility amongst watchmen and security-in-charges.

Depending upon the environment condition, wherein the watchman telephone shall be deployed, the normal or weather proof or explosion proof type of the telephone may be decided.

- d) *Engineering Order Wire (EOW)* — For telecom maintenance purpose, omni-bus communication channel is provided, which is generally the integral part of telecom transmission equipment.

2.2 Communication Facility for SCADA Application

Depending upon the SCADA system architecture, the

following types of communication channels/links are being provided, which should be compatible to RTU (Remote Terminal Unit) of various pipeline stations and SCADA Server installed at SCADA Master Control Station (SMC):

- a) *Channel for RTU polling* — Any of the following channels shall be provisioned between SCADA Master station and various pipeline stations for polling of RTU by SCADA server:

- 1) Omni-bus analog channel(s)
- 2) Omni-bus low speed async data (RS232) Channel(s) (1.2–19.2 Kbps) [Y-type, C-type]
- 3) Point-to-point low async speed (RS232) Data Channel(s) (1.2–19.2 Kbps)
- 4) 10/100 Base T ethernet channel

NOTE — The transmission system shall ensure that the above RTU channels preferably uninterrupted in case of failure of path or equipment, using suitable protection mechanism.

- b) *High speed channel between SCADA master station (SMC) and remote work stations* — For making various SCADA data, which are collected at SCADA master station, available at manned stations, point-to-point high-speed synch ($n \times 64$ kbps) data channels: V.24 or V.35 or G.703 [for 2 mbps] or 10/100 Base T ethernet channels are being provided between SCADA master station and manned stations of pipeline.
- c) *Backup channel between main SMC and stand-by SMC* — For data synchronization between SCADA master stations [main and stand-by], high-speed synch ($n \times 64$ kbps) data channel(s): V.35 or G.703 [for 2 mbps] or 10/100 Base T ethernet channels are provided between main and stand-by SMCs. This backup channel(s) is (are) required to be provided over alternate telecom transmission path between SCADA master stations.

2.3 Mobile Communication Facility

To enable pipeline maintenance personnel to communicate with the maintenance base, while on move or carrying out the job along the pipeline, mobile communication system, operating in the pipeline corridor, shall be provided.

This mobile communication sets shall have vehicle mounting provision and shall facilitate the following modes of communication:

- a) Mobile to mobile communication,
- b) Mobile to base station communication and *vice-a-versa*, and
- c) Mobile to any Telephone subscriber anywhere in pipeline route and *vice-a-versa*.

This mobile communication system typically may be any of the following type:

- a) VHF mobile system,
- b) Satellite based mobile system (Mini-M INMARSAT),
- c) Cellular Mobile system

2.4 Data Communication Facility for its Application

Depending upon the intra-office IT data communication requirement [facilitating e-mail, Intranet, ERP etc], high speed synch ($n \times 64$ Kbps: V.35/E-1, G.703) data channels or 10/100 BaseT ethernet channels amongst all the manned/attended stations may be provided as per WAN topology.

2.5 Plant Communication System

Following types of intra-plant communication may be provided at critical pipeline manned location (that is Compressor/Booster/Receiving station) for facilitating the communication amongst office, control room, field area, fire station, etc, suiting to the criticality of plant operation:

- a) VHF Walkie-talkie system,
- b) Paging system,
- c) Public address system, and
- d) EPABX system.

Depending upon the locations of usage of various communication devices of above-mentioned systems, the intrinsically safe, explosion proof and weather proof types of the devices needs to be decided and accordingly to be deployed.

2.6 Video Conferencing (Optional)

For efficient interactive communications, multi-party video conferencing facility [ISDN-BRI/IP based] may be provided amongst corporate and pipeline head quarters.

2.7 CCTV System (Optional)

For monitoring of areas such as MOV (Motor Operated Valve) and watchman gate at unmanned/manned locations of pipeline, the CCTV cameras and IR illuminator and centralised video management and network video recorder may be provided.

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BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002
Telephones : 2323 01 31, 2323 33 75, 2323 94 02

Telegrams : Manaksanstha
(Common to all offices)

Regional Offices :

	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110 002	{ 2323 76 17 2323 38 41
Eastern : 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi KOLKATA 700 054	{ 2337 84 99, 2337 85 61 2337 86 26, 2337 91 20
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160 022	{ 260 38 43 260 92 85
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600 113	{ 2254 12 16, 2254 14 42 2254 25 19, 2254 23 15
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400 093	{ 2832 92 95, 2832 78 58 2832 78 91, 2832 78 92

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